

XI. *An annotated List of the Ephemeroidea of New Zealand.* By the REV. A. E. EATON, M.A., F.Z.S.

[Read June 7th, 1899.]

PLATE X.

PSEUDO-NEUROPTERA.

Family EPHEMERIDÆ.

ICHTHYBOTUS, gen. nov.

A GENUS of the Sectional Type of *Ephemera*, resembling *Pentagenia* in style of wing-neuration, and in having the median caudal seta abortive in the ♂ imago, but either not much shorter than or subequal in length to the outer setæ in ♀. Legs as in *Ephemera*, excepting the claws of the fore tarsus of the ♂, the outer claw being hooked and the inner obtuse, instead of both alike being obtuse. Distinguished from the other genera of this Sectional Type by the ♂ genital forceps, resembling in pattern those of a *Siphururus* (cf. *S. lacustris*),—the forceps—basis subquadrate with the posterior angles obliquely truncate for the insertion of the limbs, the first joint in which is shorter than the basis. The name in Greek means *fed on by fish*.

ICHTHYBOTUS HUDSONI. (Plate X, figs. 1a—1d, details.)
Ephemera Hudsoni, McLach., Ent. Mag. (2), v, p. 270
(Dec. 1894).

Complete specimens lately received by Mr. McLachlan enable the description to be continued in respect of the ♂ and ♀ imago, and have decided what was doubtful concerning the genus. Genital forceps dull waxy yellowish, slightly dingy at the tips. Penis bifid, with thin or flattened lobes of even width, concave beneath, truncate at the tips, and divergent.

♀ Imago.—Wings transparent, tinted uniformly throughout the disk with light yellowish green, with black neuration, except near the wing-roots, where the stronger nervures become olive-brown and

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the tint of the membrane to a small extent deeper: marginal and submarginal areas of the fore-wings throughout very light reddish (burnt umber) brown. Setæ very pale sepia-brown, shifting to whitish, with the uniformly distinct joinings very narrowly picked out with blackish. Length of body ♂ 19—20, ♀ 20—21; wing ♂ 20, ♀ 21—22; setæ ♂ im. (exterior), 33, ♀ im. 19 and 18—20 and 19; anterior leg ♂ 15, ♀ 9 mm.

WELLINGTON DISTRICT (*Hudson*, No. 32).

The Sectional Type of *Leptophlebia* is represented by two genera in New Zealand, of which one is new. Mr. Lillie discovered nymphs of single species of each genus last season, and most kindly forwarded specimens to the author. Their investigation is postponed until it can be ascertained whether the discoverer purposes publishing full descriptions of them in that country or not. The nymph assigned by him to *Atalophlebia nodularis* has tracheal branchiæ of the same form as those of *Leptophlebia*: the other genus, *Delcatidium*, has acutely ovate single lamellæ.

ATALOPHLEBIA.

Tarsal claws all narrow and hooked; hind wing more or less obtusely subovate; forceps-basis of ♂ either entire, or at most merely emarginate in the middle of its apical edge. The homogeneity of this genus, alluded to with implied suspicion as long ago as 1884 in *Trans. Linn. Soc. London*, (2) *Zool.*, vol. iii, p. 84, remains uncertain. The degree of importance to be attached to the differences noted in the character of the caudal setæ of the adult flies depends largely upon whether they correspond with differences in the tracheal branchiæ of the nymphs. In identification of species, the form of the penis, the colour or markings of legs and setæ of the imago, and the colouration of wings of the subimago are items of much importance. Wings of imagines are often very similar in closely related species.

ATALOPHLEBIA VERSICOLOR, sp. nov. (Plate X, figs. 2*a* and 2*b*, details).

Subimago (dried, and perhaps partly reddened *post mortem* in the killing-bottle, like other specimens captured by Mr. Hudson).—Fore wings, in the marginal and submarginal areas, tinted with dull

reddish purple, but elsewhere marbled with blackish grey; the cross-veinlets in the lighter spaces bordered more or less narrowly with this same colouring.

Imago ♂ (dried).—Notum and legs raw umber or light pitch-brown, opaque at the extreme tips of the fore femur and fore tibia; the fore tarsus matches the tibia in tint. Abdomen and forceps dark pitch or bistre-brown; the markings faded. Setæ medium warm sepia brown, with the distinct joinings blackish; some of the alternate joinings indistinct or not coloured; the median seta lacking. Basal joint in the forceps-limbs compressed, narrowed somewhat suddenly after the acute end of the inferior dilatation. Penis-lobes contiguous to each other, concave beneath towards the line of contact, up-curved, narrowed and sloped off towards their truncate tips. Wings vitreous with black neuration; fore-wing, in the marginal and submarginal areas, tinted with transparent raw umber or brown amber; cross-veinlets of the same areas, narrowly set off with black, showing strongly, and a few of them (both near the subcostal node and again midway beyond these towards the apex), suffused by a small dark greyish cloud that extends from the costa to just below the radius. The cross-veinlets of the marginal area, all simple, number about six before and sixteen beyond the bulla. Length of wing 10—12; outer setæ 17 mm.

Hab. WELLINGTON (*Hudson*); 1 sub. (No. 47) and 1 im. Its nearest ally seems to be *A. australis*, Walk., a Tasmanian species, which has forceps of a similar pattern, but dark-banded femora and more numerous cross-veinlets in the pterostigmatic region of the fore-wing.

ATALOPHLEBIA DENTATA (Plate X, fig. 3, detail).

Lep'ophlebia dentata, Etn., Trans. Ent. Soc. London (1871), p. 80 (♂ and ♀ im.), pl. iv, 18, 18a—c (details).
Atalophlebia dentata, id., Trans. Linn. Soc. London (2), Zool., vol. iii, p. 88 (subim. and im.) [1884].

Resembles the preceding species in the form of the forceps, figured with the penis, etc., in 1871. The penis-lobes, contiguous with each other throughout, are elongate triangular and thin with their outer edge thickened. The wings of the subimago are without pale markings, and the femora without dark bands. Fig. 3 now given shows in fine stipple the extent of the yellow amber tint, and in coarser stipple that of the bistre-brown of the description of 1884; the specimen appears to have had the darker tint changed in the killing-bottle to reddish purple towards the apex of the wing;

and it may be noticed that the dark edging of the cross-veinlets of the marginal area, before the bulla, has taken the form of very small single spots.

Hab. WELLINGTON (*Hudson*, No. 33).

ATALOPHLEBIA NODULARIS.

Leptophlebia nodularis, Etn., *op. cit.* (1871), p. 81, pl. iv, figs. 20, 20a—c (details), subim. and im. ♂.

Atalophlebia nodularis, Etn., *op. ante cit.* (1884), p. 89, with reproductions of figs. 20a—c of 1871.

The forceps of this species need re-figuring, the fig. 20 of 1871 being manifestly ill-drawn. The discovery of the nymph by Mr. Lillie is noted above.

Hab. CHRISTCHURCH (*Fereday*); DUNEDIN (*Lillie*); WELLINGTON (*Hudson*, No. 46).

ATALOPHLEBIA SCITA.

Baëtis scita, Walk., List of Neuropt. Ins. in Brit. Mus., part iii, p. 570 (1853).

Leptophlebia scita, Etn., *op. supra cit.* (1871), p. 81, pl. iv, figs. 21, 21a (details).

Atalophlebia scita, id., *op. supra cit.* (1884), p. 90, pl. x, figs. 16f (details).

In the explanation of the fig. 16f, *loc. cit.*, of the penis, it is wrongly referred to as an underside view. The earlier figure was sketched from beneath, but the later from above.

Hab. CHRISTCHURCH (*Fereday*).

DELEATIDIUM, gen. nov.

Distinguished as a genus from *Leptophlebia* by the ♂ imago having genitalia conformable in pattern to those of an *Atalophlebia*, and by the nymph having tracheal branchiæ in the form of single, ovate, acute, penni-veined, foliaceous lamellæ. The cross-veinlets of the fore-wing, in the typical species, are in two of the specimens widely spaced in places, after the manner of those of the species of *Atalophlebia* here illustrated; but in the other specimens of the same and of the other sex the blanks are less noticeable or are filled up. The name in Greek signifies *a little bait*.

DELEATIDIUM LILLII, sp. nov. (Plate X, figs. 4a, 4b, details).

Subimago (in fluid).—Wings uniformly light grey with opaque neuration. Setæ grey; their joinings towards their tips evenly defined.

Imago (dried).—♂ body pitch-brown, the thorax polished above. Femora and fore tibiæ raw umber brown; fore tarsus and hinder tibiæ lighter in tint; hinder tarsi somewhat of a sepia-grey throughout. Wings vitreous with pitch-black neuration, except in the fore-wing the finer cross veinlets of the marginal and submarginal areas that precede the pterostigmatic region (which are deficient in colouring), and the roots of the stronger nervures interior to the humeral cross-vein, which are raw umber brown; the membrane at the extreme roots is almost imperceptibly tinted raw umber or greenish. In the marginal area of the fore-wing, before the bulla, are usually about 6 faint cross-veinlets, and beyond that 2—4 faint and 8—11 stronger veinlets, all simple. Setæ light sepia-grey with blackish joinings, of which some in the basal quarter are alternately distinct and faint. In the abdomen, segments 3—6 are sometimes transparent and whitish to a variable extent at the base.

♀ very like the ♂, but the colouring at the fore-wing roots, interior to the humeral cross-vein, is rather darker in tint. The marginal area of the fore-wing contains about 3—5 faint cross-veinlets before the bulla, and two faint and thirteen stronger beyond that, all simple. Ventral lobe of the ninth abdominal segment slightly (not deeply) emarginate, with acute points.

Length of body 8—9, wing 12; setæ ♂ im. 51 mm.

Hab. DUNEDIN (*Lillie*); WELLINGTON (*Hudson*, No. 46).

Mr. Lillie's consignment comprised nymph and both sexes in subimago and imago; Mr. Hudson's 3 ♂ & 1 ♀ im.

It is remarkable that up to the present time all New Zealand representatives of the 3rd Group of Sections of the Family belong exclusively to genera of the Sectional Type of *Siphururus*. Three genera, *Coloburiscus*, *Ameletus*, *Oniscigaster*, furnish between them six species to the fauna.

COLOBURISCUS.

Hind tibia distinctly longer than the tarsus; basal joint in the hind tarsus vaguely marked off from the tibia, except at the sole (where spinules at the apex of the tibia

set out its limits), measured along which it is shorter than the next joint. In all the tarsi, irrespective of sex, the outer or posterior claw is narrow and hooked, the inner broad and obtuse. Costal shoulder of the hind wing remarkably acute-angled. In *Trans. Linn. Soc. London*, (2) vol. iii,* pl. xvii, 32*b* legs 2 and 3 ♀ of a North American species, the tibio-tarsal joining should have been shown by stipple instead of a firm line.

COLOBURISCUS HUMERALIS.

For synonymy refer to *op. cit.*, p. 202. Compared with the description there given, the ♂ imagines lately forwarded by Mr. Hudson appear to have the pterostigmatic tint darker than the specimens described, the newer colouring approaching pitch-brown. The tint is lighter in the females accompanying them, and in another much smaller specimen of this sex from Wellington is very faint indeed. But this last individual ♀, from the fact of its caudal setæ being collapsed and greyish white with the joinings very narrowly black, may have been killed before its colouring was fully developed. The nymph is still unknown.

Hab. WELLINGTON (*Hudson*, Nos. 31, 65); CHRISTCHURCH (*Fereday*) and OTAGO.

AMELETUS.

Hind tibia subequal in length to (hardly if at all longer than) the tarsus; basal joint in this tarsus, measured along the sole, equal to the next joint, and also dorsally subequal thereto, the breadth of the colouring of the tibio-tarsal

* N.B.—The following corrections needed in the writing of Plates XVIII—XX of the volume cited may advantageously be noted here:—

Plate XVIII, in head-line, for COLOBORUS read COLOBURISCUS: also for SIPHLURUS ? (and Pl. XX) read AMELETUS (and Pls. XIX, 33 ? c, LXIV, 22—24, and LXV, 13). Also at foot for S. ? femoratus read A. subnotatus.

Plate XIX, in head-line, for COLOBORUS read COLOBURISCUS: also after CHIROTNETES add 33 ? AMELETUS. Also at foot for haleuticus read haleuticus; and after 33*c*, for Ch. read A.

Plate XX, in head-line, for 34 read 34*c*: also commence the line with ? 34*b* METAMONIUS. Also at foot, after *b*, for S read M; and after *c* insert S.

Attention to these corrections will greatly facilitate the identification of genera.—A. E. E.

boundary making it difficult to ascertain their exact proportions dorsally. In every tarsus the outer or posterior claw is narrow and hooked, the inner broad and obtuse. Costal shoulder of the hind-wing obtuse.

AMELETUS ORNATUS (Plate X, fig. 5, detail).

Chirotonetes (?) *ornatus*, Etn., Trans. Linn. Soc. London, (2) Zool., vol. iii, p. 208 (nominal reference), pl. xix, figs. 33 ? c, details (1885), described p. 321 (1888).

Although the genus *Ameletus* was published in *op. cit.* at pp. 201 and 210 (1885) with illustrations (*cf.* footnote *ante* under *Coloburiscus*), it was only while writing the present article that this species was recognised as one of it. The subimago, of which a wing is now figured, is referred to here on account of the leg-markings; the colour of the wings seems to have been modified to some extent by the killing-bottle.

Hab. CHRISTCHURCH (*Wakefield*); WELLINGTON (*Hudson*, No. 42).

AMELETUS PERSCITUS, sp. nov.

Subimago (dried).—Wings and setæ dull light yellowish, nearly of the same tint as those of *Heptagenia sulphurea*. Abdomen of a very light yellowish ochre, with a dull longitudinal median dorsal purplish stripe, extending from the base nearly to the last segment, strongly contrasted with the ground colour. This stripe is composed of concatenated spots (perhaps truncated triangles) wide behind, and somewhat blackened at the overlapping apical borders of the segments on each side of a small pale median apical spot: hence it might be described as serrated on each side. Venter spotless.

Imago (dried) ♀.—Wings vitreous, tinted with light yellowish green; neuration olive brown, shifting to pitch-brown and olive green with change of stand-point: cross-veinlets numerous in the marginal area; those in the pterostigmatic portion branched towards the costa and anastomosing. Anterior legs of rather a browner light yellowish colour than the hinder; these tending rather towards yellowish amber; the apical edges of the tarsal joints narrowly blackened, and the last two joints in the fore tarsus, or three joints in the hinder, tinged to a large extent with dark grey. Length of wing 18—20 mm.

Hab. WELLINGTON (*Hudson*, ♀ 1 im. & subim., No. 26).

N.B.—This is the species figured and described (without name) by Mr. Hudson in his Manual of New Zealand Entomology, p. 105, pl. xvi, fig. 4.

ONISCIGASTER.

Hind tibia much shorter than the tarsus, of which the basal joint is much longer than the next. In all the tarsi, and in both sexes, the outer or posterior claw is narrow and hooked, the inner claw broad and obtuse, thus differing from *Siphlyrus*, which has all the claws narrow and hooked. The differences between their nymphs need not here be dwelt upon.

ONISCIGASTER WAKEFIELDI.

Oniscigaster Wakefieldi, McLach., Ent. Mo. Mag., vol. x, p. 108—110, woodcut (1873, Oct.); *id.*, Journ. Linn. Soc. Zool., xii, pp. 139—146, pl. v, 1—5 g. (1874); Etn., Trans. Linn. Soc. London, (2) Zool., vol. iii, p. 224, pl. xxi, 36 (details imago) and pl. Li (nymph).

In this species, the ♀ has 3 dorsal segments, viz. the 7th to 9th, sinuate somewhat deeply on each side at the posterior margin, and dilated laterally into thin expansions that are rounded off to the base in front and acute behind, so as to form broad serratures like coxæ of *Oniscus murarius*. Above these the dorsum, in dried specimens, is somewhat fornicate with a median longitudinal depression. The first and second of the lateral serratures are broader and are rather more produced at the point than the third.

Hab. CHRISTCHURCH (*Wakefield*).

ONISCIGASTER INTERMEDIUS, sp. nov. (Plate X, fig. 6a, detail).

A single ♀ im. differs from *O. Wakefieldi* in having only 2 dorsal segments, viz. the 8th and 9th, dilated laterally, and this only moderately: dorsum sub-fornicate above the dilatation. Lateral borders of 8th segment almost straight, except where they gently curve inwards near the base, and very nearly parallel, diverging to only a very small extent posteriorly: dorsum transverse at the posterior margin: the postero-lateral angles obtuse. Ninth segment as broad, or perhaps a little broader than the 8th; its lateral margins saliently curved and bordered each by a linear flange terminating posteriorly in a minute point: the posterior margin of the dorsum transverse between these points. Wings marked as in *O. Wakefieldi*.

Hab. M'ARTHUR, NELSON, 3600 feet (*Hudson*, No. 34a).

ONISCIGASTER DISTANS, sp. nov. (Plate X, figs. 6b & 6c, details).

Resembles *O. Wakefieldi* in size and markings, but differs in the dorsal segments 6—9 not being produced into lateral flanges oniscoidally; their dorsa are roundly arched, with the posterior lateral angles obtuse, not produced, and the posterior margin transverse. In the fore wings the edging of the dark-bordered veinlets in the wider parts of the first two areas is more neatly defined and not blurred; and the wider part of the pterostigmatic region is more distinctly tinted with warm sepia grey than in the other species. I have seen only 1 ♂ subimago (of which the wings are blackish-grey with black neuration narrowly edged with grey, and with a pale spot extending forwards from the præbrachial (6) fork, and a curved narrow band running transversely from the costa at the base of the wing immediately exterior to the humeral cross-vein) and 2 ♀ im. The setæ of the adult ♀ are piceous, or greyish with black joinings.

Hab. WAINUI-O-MATA RIVER, WELLINGTON (*Hudson*, No. 34 and 34b).

In the allied genus *Siphilurus*, a specific difference is noticeable in the lateral outline of some of the abdominal segments of *S. armatus* and *S. lacustris*, ♂ im. analogous to that noted between *O. Wakefieldi* and *O. distans*; but the difference is not nearly so great as in these species of *Oniscigaster*.

EXPLANATION OF PLATE X.

[See explanation facing the PLATE.]